ADDED

38. (Added) A method of introducing nucleic acid molecules into eukaryotic cells comprising:

(a) depositing a plurality of nucleic acid molecule-containing mixtures onto a surface in discrete, defined locations, wherein each of the nucleic acid molecule-containing mixtures comprises a gelatin and nucleic acid molecule to be introduced into eukaryotic cells;

(b) allowing the nucleic acid molecule-containing mixtures to dry on the surface, thereby producing a surface having the nucleic acid molecule-containing mixtures affixed thereon in discrete, defined locations;

(c) plating the eukaryotic cells onto the surface in sufficient density and under appropriate conditions for entry of the nucleic acid molecules in the nucleic acid molecule-containing mixture into the eukaryotic cells; and

wherein the affixed plurality of nucleic acid molecules forms an array comprising at least 10 different discrete sequences and whereby the nucleic acid molecules are introduced into the eukaryotic cells in the location in which the nucleic acid molecules were deposited, thereby forming an array of cells comprising the nucleic acid molecules.

ADDED

39. (Added) The method of claim 38, further comprising the steps after step (b) of:

(i) covering the surface bearing the nucleic acid molecule-containing mixture with an appropriate amount of a lipid-based transfection reagent and maintaining the resulting product under conditions appropriate for complex formation between the nucleic acid molecules in the nucleic acid molecule-containing mixture and the transfection reagent; and

(ii) removing the non-complexed transfection reagent.

ADDED PnA

40. (Added) The method of claim 38, wherein said nucleic acid molecule-containing mixtures further comprise a sugar; a buffer that facilitates nucleic acid molecule condensation and an appropriate lipid-based transfection reagent.

ADDED PnA

41. (Added) The method of claim 38, wherein each nucleic acid molecule to be introduced is contained in a vector.

ADDED PnA

42. (Added) The method of claim 41, wherein the vector is an episomal vector or a chromosomal integrating vector.

ADDED PnA

43. (Added) The method of claim 41, wherein the vector is a plasmid or a viral-based vector.

ADDED PnA

44. (Added) The method of claim 43, wherein the vector is an expression vector.

ADDED PnA

45. (Added) The method of claim 44, wherein said nucleic acid molecules are expressed in the eukaryotic cells.

ADDED PnA

46. (Added) The method of claim 38, wherein the surface is glass, polystyrene or plastic, optionally coated with poly-L-lysine.

ADDED PnA

47. (Added) The method of claim 38, wherein the surface is the surface of a slide.

ADDED PnA

48. (Added) The method according to claim 47, wherein the slide is a glass slide coated with poly-L-lysine or a gamma-amino propyl silane slide.

ADDED PnA

49. (Added) The method of claim 38, wherein the eukaryotic cells are mammalian cells.

ADDED PnA

50. (Added) The method of claim 49, wherein the cells are plated at a density of $0.3 \times 10^5/cm^2$ to $3.0 \times 10^5/cm^2$.

ADDED PnA

51. (Added) The method of claim 38, wherein said nucleic acid molecule is an oligonucleotide, DNA or RNA.

ADDED PmA

52. (Added) The method of claim 51, wherein said nucleic acid molecule is DNA.

ADDED PmA

53. (Added) The method of claim 38 or 39, wherein said nucleic acid molecule is DNA and wherein the concentration of said DNA is 0.01 μg/μl to 0.5 μg/μl.

ADDED PmA

54. (Added) The method according to claim 53, wherein the concentration of said DNA is 0.02 μg/μl to 0.1 μg/μl.

ADDED PmA

55. (Added) The method according to claim 40, wherein said nucleic acid molecule is DNA and wherein the concentration of said DNA is 0.1 μg/μl to 2.0 μg/μl.

ADDED PmA

56. (Added) The method of claim 38, wherein said nucleic acid molecules encode polypeptides that are expressed in the eukaryotic cells.

ADDED PmA

57. (Added) The method of claim 38, wherein said nucleic acid molecules, when introduced into the eukaryotic cells, inhibit a function of a gene in the eukaryotic cell.

ADDED PmA

58. (Added) The method of claim 38, wherein the gelatin is selected from the group consisting of a protein gelatin, a hydrogel, a sugar-based gelatin or a synthetic gelatin.

ADDED PmA

59. (Added) The method of claim 58, wherein the gelatin is present at a concentration in the nucleic acid molecule-containing mixture of from about 0.05% to about 0.5%.

ADDED PmA

60. (Added) The method of claim 59, wherein the gelatin is present at a concentration in the nucleic acid molecule-containing mixture of from about 0.1% to about 0.2%.

ADDED PmA

61. (Added) The method of claim 39, wherein the gelatin is selected from the group consisting of a protein gelatin, a hydrogel, a sugar-based gelatin or a synthetic gelatin.

ADDED PmA

62. (Added) The method of claim 61, wherein the gelatin is present at a concentration in the nucleic acid molecule-containing mixture of from about 0.05% to about 0.5%.

ADDED PmA

63. (Added) The method of claim 62, wherein the gelatin is present at a concentration in the nucleic acid molecule-containing mixture of from about 0.1% to about 0.2%.

ADDED PmA

64. (Added) The method of claim 40, wherein the gelatin is selected from the group consisting of a protein gelatin, a hydrogel, a sugar-based gelatin or a synthetic gelatin.

ADDED PmA

65. (Added) The method of claim 64, wherein the gelatin is present at a concentration in the nucleic acid molecule-containing mixture of from about 0.01% to about 0.05%.

ADDED PmA

66. (Added) The method of claim 65, wherein the sugar is sucrose and the concentration of sucrose is from about 0.1 M to about 0.4 M.

ADDED PmA

67. (Added) The method of any one of claims 58, 61 or 64, wherein the gelatin is Type B gelatin.

ADDED PmA

68. (Added) The method of claim 67, wherein the mammalian cells are plated at high density onto the surface, each nucleic acid molecule to be introduced is contained in a vector, and the surface is a slide.

ADDED PmA

69. (Added) The method of claim 68, wherein the vector is an expression vector and said nucleic acid molecules are expressed in the eukaryotic cells.

ADDED PmA

70. (Added) The method of claim 69, further comprising identifying eukaryotic cells in which a protein of interest is expressed, comprising the steps after step (c) of

(1) containing eukaryotic cells with an antibody which binds the protein of interest and

(2) detecting binding of the antibody, wherein binding identifies eukaryotic cells in which the protein of interest is expressed

ADDED PmA

71. (Added) The method of any one of claims 58, 61 or 64, wherein the gelatin is a hydrogel.

ADDED PmA

72. (Added) The method of claim 71, wherein the hydrogel is selected from the group consisting of polycarboxylic acid, cellulosic polymer, polyvinylpyrrolidone, maleic anhydride polymer, polyamide, polyvinyl alcohol and polyethylene oxide.

ADDED PmA

73. (Added) The method of claim 38, wherein at least two different nucleic acid molecules are co-transfected into a eukaryotic cell.

ADDED PmA

20

74. (Added) The method of claim 38, wherein the array comprises at least 100 different discrete, defined locations of known sequence composition.

ADDED PmA

75. (Added) The method of claim 38, wherein the array comprises at least 1000 different discrete, defined locations of known sequence composition.

ADDED PmA

76. (Added) The method of claim 38, wherein the array comprises at least 10,000 different discrete, defined locations of known sequence composition.

ADDED PmA

77. (Added) The method of claim 38, wherein each of the defined locations is 100-200 μm in diameter.

ADDED PmA

78. (Added) The method of claim 77, wherein each of the defined locations is 200-500 μm apart from each other.

ADDED PmA

79. (Added) The method of claim 78, wherein each of the defined locations is 400 μm apart from each other.

ADDED PmA

80. (Added) The method of claim 38, wherein said affixed plurality of nucleic acid molecules form an array of nucleic acid molecules and wherein said cells into which the nucleic acid molecules are introduced form an array of cells comprising the nucleic acid molecules.

ADDED

81. (Added) An array produced by the method of any one of claims 38-40.

ADDED

82. (Added) The method of claim 49, wherein the cells are selected from the group consisting of primate, human, canine, feline, bovine, porcine, rat and mouse cells.

ADDED

83. (Added) The method of claim 38, wherein the cells are derived from normal tissue, diseased tissue, embryonic tissue, adult tissue, differentiated cells or non-differentiated cells.

ADDED

84. (Added) The method of claim 38, wherein, prior to step (c), the cells are engineered to

(i) express one or more recombinant genes;

(ii) have a loss-of-function phenotype;

(iii) have a gain-of-function phenotype; or

(iv) express a recombinant cell surface receptor.

B'

ADDED

85. (Added) The method of claim 38, wherein the nucleic acid molecules comprise at least one target sequence.

ADDED

86. (Added) The method of claim 85, wherein the target sequence is from about 200 nucleotide to about 10 kb in size.

ADDED

87. (Added) The method of claim 38, wherein the nucleic acid molecules comprise

(a) a variegated library of expression vectors;

(b) a library of related mutated sequences; or

(c) a library of small gene fragments.

ADDED Part A

88. (Added) The method of claim 87, wherein the nucleic acid molecules comprise a library of small gene fragments and wherein at least one of the small gene fragments encodes a dominant acting synthetic genetic element.

ADDED Part A

89. (Added) The method of claim 88, wherein the synthetic genetic element is an antagonist or an agonist.

ADDED Part A

90. (Added) The method of claim 87, wherein the nucleic acid molecules comprise a library of small gene fragments and wherein the small gene fragments encode molecules selected from the group consisting of polypeptides, inhibitory antisense RNA molecules, ribozymes, nucleic acid decoys and small peptides.

ADDED Part A

91. (Added) The method of claim 87, wherein the nucleic acid molecules comprise a library of small gene fragments and wherein the library of small gene fragments is provided in the form of an expression library having inserts of from about 100 base pairs to about 700 base pairs.

B'

ADDED Part A

92. (Added) The method of claim 87, wherein the nucleic acid molecules comprise a library of small gene fragments and wherein the library of small gene fragments is generated from a cDNA library selected from the group consisting of a total cDNA library, a normalized cDNA library, and a subtractive cDNA library.

ADDED Part A

93. (Added) The method of claim 87, wherein the nucleic acid molecules comprise a library of small gene fragments and wherein the library of small gene fragments is generated from genomic DNA fragments or by randomly fragmenting a gene or genomic region of interest to obtain a random fragment expression library.

ADDED Part A

94. (Added) The method of claim 87, wherein the nucleic acid molecules comprise a library of small gene fragments and wherein the library of small gene fragments encodes a variegated population of small peptides.

ADDED Part A

95. (Added) The method of claim 85, wherein the target sequence, upon transcription, forms a double stranded RNA molecule.

ADDED Part A

96. (Added) The method of claim 38, wherein the nucleic acid molecules comprise a library comprising coding sequences that are expressed as a portion of a

chimeric protein, the chimeric protein optionally comprising an unstructured polypeptide linker region between one or more of the portions derived from different proteins.

ADDED Per A

97. (Added) The method of claim 38, wherein the nucleic acid molecules encode a peptide library engineered for secretion.

ADDED Per A

98. (Added) The method of claim 38, wherein the array provides a density of at least 10^2 to 10^6 different features per square centimeter.

ADDED Per A

99. (Added) The method of claim 98, wherein the array provides a density of 10^2 to 10^3 different features per square centimeter.

ADDED Per A

100. (Added) The method of claim 99, wherein the array provides a density of 10^2 to 10^4 different feature per square centimeter.

B'

ADDED Per A

101. (Added) The method of claim 73, wherein 2 to 10 different target sequences are co-transfected into a eukaryotic cell.

ADDED Per A

102. (Added) The method of claim 101, wherein the affixed plurality of nucleic acid molecules forms an array comprising a combinatorial combination of nucleic acid molecules which, when introduced into the cells, forms an array of cells comprising combinatorial combinations of co-expressed nucleic acid molecules.

ADDED Per A

103. (Added) An array produced by the method of claim 102.

ADDED Per A

104. (Added) The method of claim 38, wherein the surface is a microsphere or a fiber optic system.

ADDED Per A

105. (Added) The method of claim 38, wherein the surface is coated with a cationic moiety or with molecules having additional functions.

ADDED Per A

106. (Added) The method of claim 38, further comprising the step after step (c) of transferring the eukaryotic cells from their location on the surface to a location on a second surface.

ADDED Per A

107. (Added) The method of claim 106, wherein the second surface is flexible or porous.

ADDED Per A

108. (Added) The method of claim 106, wherein the second surface is selected from the group consisting of a surface of glass, plastic, silicon, metal, membrane, paper, biomaterial, tissue and mineral, and wherein the surface is optionally derivatized.

ADDED Per A

109. (Added) A method of affixing nucleic acid molecules to a surface, to produce an array of nucleic acid molecules of known sequence or source in discrete, defined locations, comprising

(a) depositing a plurality of nucleic acid molecule-containing mixtures onto a surface in discrete, defined locations, wherein each of said nucleic acid mixtures comprises a nucleic acid molecule and a gelatin, and wherein the array provides a density of at least 10^2 features per square centimeter; and

(b) allowing the resulting surface bearing the nucleic acid molecule-containing mixtures to dry sufficiently such that the nucleic acid molecules are affixed to the surface in discrete, defined locations under conditions in which the nucleic acid molecules may be introduced into eukaryotic cells.

ADDED Per A

110. (Added) The method of claim 109, wherein said nucleic acid mixture further comprises a sugar; a buffer that facilitates nucleic acid molecule condensation and an appropriate lipid-based transfection reagent.

ADDED Per A

111. (Added) The method of claim 109 or 110, wherein the gelatin is selected from the group consisting of a protein gelatin, a hydrogel, a sugar-based gelatin or a synthetic gelatin.

ADDED Per A

112. (Added) The method of claim 109, wherein each nucleic acid molecule is contained in a vector.

ADDED Per A

113. (Added) The method of claim 112, wherein the vector is an episomal vector or a chromosomally integrated vector.

ADDED PerA

114. (Added) The method of claim 112, wherein the vector is a plasmid or a viral-based vector.

ADDED PerA

115. (Added) The method of claim 112, wherein the vector is an expression vector.

ADDED PerA

116. (Added) The method of claim 109, wherein the surface is glass, polystyrene or plastic, wherein said surface is optionally coated with poly-L-lysine.

ADDED PerA

117. (Added) The method of claim 109, wherein the surface is the surface of a slide.

ADDED PerA

118. (Added) The method of claim 117, wherein the slide is a glass slide coated with poly-L-lysine or a gamma-amino propyl silane slide.

ADDED PerA

119. (Added) The method claim 109, wherein said nucleic acid molecule is an oligonucleotide, DNA or RNA.

B'

ADDED PerA

120. (Added) The method of claim 119, wherein said nucleic acid molecule is DNA.

ADDED PerA

121. (Added) The method of claim 109, wherein said nucleic acid molecule is DNA and wherein the concentration of said DNA is 0.01 μg/μl to 0.5 μg/μl.

ADDED PerA

122. (Added) The method according to claim 121, wherein the concentration of said DNA is 0.02 μg/μl to 0.1 μg/μl.

ADDED PerA

123. (Added) The method according to claim 110, wherein said nucleic acid molecule is DNA and wherein the concentration of said DNA is 0.1 μg/μl to 2.0 μg/μl.

ADDED PerA

124. (Added) The method of claim 109, wherein said nucleic acid molecules encode polypeptides that are expressed in the eukaryotic cells.

ADDED PerA

125. (Added) The method of claim 109, wherein said nucleic acid molecules, when introduced into the eukaryotic cells, inhibits a function of a gene in the eukaryotic cell.

ADDED Per A

126. (Added) The method of claim 109, wherein the gelatin is present at a concentration in the nucleic acid molecule-containing mixture is from about 0.05% to about 0.5%.

ADDED Per A

127. (Added) The method of claim 126, wherein the concentration of gelatin is from about 0.1% to about 0.2%.

ADDED Per A

128. (Added) The method of claim 110, wherein the gelatin is present at a concentration in the nucleic acid molecule-containing mixture is from about 0.01% to about 0.05%.

ADDED Per A

129. (Added) The method of claim 128, wherein the sugar is sucrose and the concentration of sucrose is from about 0.1M to about 0.4M.

ADDED Per A

130. (Added) The method of claim 126 or 129, wherein the gelatin is Type B gelatin.

ADDED Per A

131. (Added) The method of claim 109, wherein the array comprises at least 100 different discrete, defined locations of known sequence composition.

ADDED Per A

132. (Added) The method of claim 131, wherein the array comprises at least 1000 different discrete, defined locations of known sequence composition.

ADDED Per A

133. (Added) The method of claim 132, wherein the array comprises at least 10,000 different discrete, defined locations of known sequence composition.

ADDED Per A

134. (Added) The method of claim 109, wherein each of the defined locations is 100-200 μm in diameter.

ADDED Per A

135. (Added) The method of claim 134, wherein each of the defined locations is 200-500 mm apart from each other.

ADDED Per A

136. (Added) The method of claim 135, wherein each of the defined locations is 400 mm apart from each other.

ADDED Per A

137. (Added) An array produced by the method of any one of claims 109-110.

ADDED Part

138. (Added) The method of claim 109, wherein each location comprises at least two different nucleic acid molecules that may be introduced into a single eukaryotic cell.

ADDED Part

139. (Added) The method of claim 111, wherein the gelatin is a hydrogel.

ADDED Part

140. (Added) The method of claim 139, wherein the hydrogel is selected from the group consisting of polycarboxylic acid, cellulosic polymer, polyvinylpyrrolidone, maleic anhydride polymer, polyamide, polyvinyl alcohol and polyethylene oxide.

ADDED Part

141. (Added) The method of claim 109, wherein the nucleic acid molecules comprise at least one target sequence.

ADDED Part

142. (Added) The method of claim 141, wherein the target sequence is from about 200 nucleotide to about 10 kb in size.

B1

ADDED Part

143. (Added) The method of claim 109, wherein the nucleic acid molecules comprise

(a) a variegated library of expression vectors;

(b) a library of related mutated sequences; or

(c) a library of small gene fragments.

ADDED Part

144. (Added) The method of claim 143, wherein the nucleic acid molecules comprise a library of small gene fragments and wherein at least one of the small gene fragments encodes a dominant acting synthetic genetic element.

ADDED Part

145. (Added) The method of claim 144, wherein the synthetic genetic element is an antagonist or an agonist.

ADDED Part

146. (Added) The method of claim 143, wherein the nucleic acid molecules comprise a library of small gene fragments and wherein the small gene fragments encode molecules selected from the group consisting of polypeptides, inhibitory antisense RNA molecules, ribozymes, nucleic acid decoys and small peptides.

ADDED Per A

147. (Added) The method of claim 143, wherein the nucleic acid molecules comprise a library of small gene fragments and wherein the library of small gene fragments is provided in the form of an expression library having inserts of from about 100 base pairs to about 700 base pairs.

ADDED Per A

148. (Added) The method of claim 143, wherein the nucleic acid molecules comprise a library of small gene fragments and wherein the library of small gene fragments is generated from a cDNA library selected from the group consisting of a total cDNA library, a normalized cDNA library, and a subtractive cDNA library.

ADDED Per A

149. (Added) The method of claim 143, wherein the nucleic acid molecules comprise a library of small gene fragments and wherein the library of small gene fragments is generated from genomic DNA fragments or by randomly fragmenting a gene or genomic region of interest to obtain a random fragment expression library.

B1 ADDED Per A

150. (Added) The method of claim 146, wherein the library of small gene fragments encodes a variegated population of small peptides.

ADDED Per A

151. (Added) The method of claim 141, wherein the target sequence, upon transcription, forms a double stranded RNA molecule.

ADDED Per A

152. (Added) The method of claim 109, wherein the nucleic acid molecules comprise a library comprising coding sequences that are expressed as a portion of a chimeric protein, the chimeric protein optionally comprising an unstructured polypeptide linker region between one or more of the portions derived from different proteins.

ADDED Per A

153. (Added) The method of claim 109, wherein the nucleic acid molecules encode a peptide library engineered for secretion.

ADDED Per A

154. (Added) The method of claim 109, wherein the array provides a density of at least 10^3 to 10^5 different features per square centimeter.

ADDED Per A

155. (Added) The method of claim 154, wherein the array provides a density of at least 10^3 to 10^4 different features per square centimeter.

ADDED Per A

156. (Added) The method of claim 138, wherein each location comprises 2 to 10 different target sequences.

ADDED Per A

157. (Added) The method of claim 156, wherein the affixed plurality of nucleic acid molecules forms an array comprising a combinatorial combination of nucleic acid molecules.

ADDED Per A

158. (Added) The method of claim 109, wherein the surface is a microsphere or the end of a fiber optic system.

ADDED Per A

159. (Added) The method of claim 109, wherein the surface is coated with a cationic moiety or with molecules having additional functions.